THE CITY OF Kalamazoo

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Michael Berkoff
Remedial Project Manager
U.S. EPA Region 5
Superfund Division, Remedial Response Section #2
77 West Jackson Boulevard
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Chicago, IL 60604-3507

RE: "Supplemental Groundwater Investigation Report" for Allied Paper Site

Dear Mr. Berkoff:

Enclosed is a written summary prepared by City staff and representatives of NTH Consultants, Ltd. regarding the review of the above-referenced report dated October 2009 and prepared by ARCADIS for the Allied Paper (OU-1) Site.

The summary discusses the concern that the site is within a MDEQ-approved Wellhead Protection Area Five-Year Capture Zone, and notes the incompleteness/failure of the Remedial Investigation (RI) Report and Supplemental Groundwater Investigation Report to address the potential migration pathway for contaminants at the OU-1 to reach the regional groundwater flow system, potentially impacting the City's Public Water Supply System. These concerns have similarly been expressed in our written technical comments to the Remedial Investigation Report, and expressed in other correspondence and at previous meetings.

Perhaps the greatest disappointment has been the apparent lack of objective technical review of the RI Report by CHM2Hill, USGS, and EPA staff, of any of ARACADIS' work. Consequently, the City has had to invest its resources to perform an exhaustive review of the documentation and provide numerous comments and recommendations via written correspondence and reports, meetings and telephone calls. Despite all of the City's efforts, EPA still has not required the necessary collection and evaluation of additional data.

If you have any questions, please contact me at 269-337-8667 or by E-mail at wetzelm@kalamazoocity.org.

Sincerely,

Michael C. Wetzel

Michael C. Wetzel, P.E.
Environmental Services Superintendent

c: Bruce Merchant, Public Services Director
John P. Paquin, Environmental Programs Manager
Rick Burns, NTH Consultants, Ltd.

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City of Kalamazoo Comments in Response to the Review of "Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site Supplemental Groundwater Investigation Report Allied Operable Unit, Kalamazoo, Michigan October 2009" and the Site's Superfund Process Status

BACKGROUND

The Site from CERCLA to the National Priority List (NPL)

In 1986, the Michigan Department of Natural Resources (MDNR) prepared a "Site Inspection Report and Hazardous Ranking System Packet" for the Allied Paper-Portage Creek-Kalamazoo River CERCLA Site. As part of this packet, the following were noted:

- "Potential Hazardous Waste Site Inspection Report Part 3 – Description of Hazardous Conditions and Incidents" includes the following statements: "Samples taken from monitoring wells around landfill show PCBs in groundwater. Municipal wells potentially affected" and "Potential from migration of contaminated groundwater to municipal wells…"
- The "Ground Water Route Work Sheet" scored the highest possible for the rating factors of "Observed Release," "Route Characteristics" (depth to aquifer of concern, net precipitation, permeability of the unsaturated zone, and physical state), and "Waste Characteristics" (toxicity, persistence, hazardous waste quantity). The rating factor for "Targets" (groundwater use, distance to nearest well/population served) scored 41 out of 49.

In 1990, the site was placed on the NPL which stated in its justification "An estimated 142,000 people obtain their drinking water from public wells within 3 miles of the site, the nearest 1.1 miles from the site. No alternate unthreatened sources of water are now available." It appears that the evidence and potential for further groundwater contamination was largely responsible for the placement of the Allied Site on the NPL.

Wellhead Protection Program

The MDNR initial characterization is alarming itself, but the concerns are amplified by the additional issues related to the municipal wellfield. Specifically, Subsection 1428(e) of the Safe Drinking Water Act Amendments of 1986 identify a *'Wellhead Protection Area'*, or WHPA as: "the surface and subsurface area surrounding a well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field." The City of Kalamazoo has a MDEQ-approved WHPA delineated for all of its Water Pumping Stations (WPSs). The groundwater modeling performed for the WHPA for its WPSs 1, 2, 3, 4, and 7 determined that the Allied Paper Site (OU-1), part of the Kalamazoo River Superfund Site, is located within its WHPA, and specifically within a five-year capture zone. Thus by definition or inference, a groundwater pathway is assumed to exist between the OU-1 site and the city's wellfields. Consequently, the City is concerned that contaminants located at the Allied Paper Site have a reasonable potential to migrate off site and eventually impact its drinking water supplies.

MDNR raised legitimate, significant concerns regarding the potential of contaminants migrating off-site and potentially affecting the drinking water supply in its initial Site Inspection but these were later ignored. In fact, none of the issues originally identified by MDNR (e.g., those issues largely responsible for being placed on the NPL in the first place) are even mentioned in the Remedial Investigation report.

REMEDIAL INVESTIGATION REPORT

A Remedial Investigation (RI) was performed for OU-1 was intended to determine the nature and extent of contamination and is documented in the March 2008 RI Report. The City reviewed the RI Report and subsequently submitted numerous comments via reports, letters, e-mails, and verbally at meetings and telephone conversations about its incompleteness in regards to the potential future impact to the City's drinking water supply.

To be clear, the City's position has been consistent since our review of the RI Report: additional information regarding the deeper regional aquifer beneath and north of the OU-1 is needed to allow appropriate characterization of the hydrogeologic conditions and to determine the risk to groundwater posed by the potential migration of the myriad of contaminants (especially metals) detected at the site. Specifically, we have insisted that additional information including deeper borings/wells, associated detailed cross-sections, water levels, and additional water quality data are necessary to provide a basis for a complete assessment. Further, the EPA has yet to explain their decision to dismiss the accuracy/validity of the MDEQ-approved WHPA, especially since OU-1 is situated within a five-year capture zone, a sub-set of the MDEQ required 10-year capture zone delineation.

However, to our surprise and disappointment, the EPA accepted (approved) the RI Report as written despite the City's persistent, repeated concern for its wellfields and the need to fill obvious data gaps and revise the report accordingly. The EPA is currently within the Feasibility Study (FS) phase of the CERCLA process that is intended to assess the treatability of site contamination and evaluate the potential performance and cost of treatment technologies. Given EPA's supposition that the regional groundwater from which the City of Kalamazoo draws its drinking water supply will not be impacted by the Allied Site, we can unfortunately conclude that a selected remedial action may not necessarily be protective of the regional groundwater. Concurrently, on behalf of the Responsible Party (RP) Millennium Holdings, LLC, ARCADIS has completed a "Supplemental Groundwater Investigation" and associated report dated October 2009, purportedly to address the concerns raised by the City about the lack of adequate hydrogeologic information for the site, particularly regarding the lower, regional aquifer.

The City of Kalamazoo has invested an inordinate amount of our resources to review the documents produced to date regarding OU-1 and have identified errors, deficiencies, and misconstrued interpretations of facts. We believe it incumbent on the USEPA, the MDEQ, and their independent consultants to do the hard and difficult work associated with a complete, thorough and focused review of work produced on behalf of the responsible party. Had the agencies properly completed this arduous but absolutely necessary task originally, they would have identified the same issues and directed now wasted energy toward resolution of outstanding, mutual concerns.

It is patently unfair that the City was forced to finance and complete a detailed review of the RI and identify the issues that should have been discovered by USEPA/MDEQ and it is troublesome to think no other objective third-party review would have been completed. Ideally, the roles will be reversed with EPA completing a thorough detailed review and the City serving in a cursory role moving forward as Millennium/ARCADIS proceed from the Feasibility Study, remedial action plan, and implementation phases of the CERCLA process.

ARCADIS "SUPPLEMENTAL GROUNDWATER INVESTIGATION REPORT"

Much to our chagrin, ARCADIS' supplemental groundwater study included obtaining only a single set of water level measurements (except for two at the Strebor site) and the preparation of associated tables, graphs, and other figures. The supplemental work essentially only updated water level data for the surficial aquifer conditions, again missing an opportunity to obtain additional knowledge of the aquifer beneath the OU-1 site. This limited scope was approved by EPA despite the City's recommendations that the supplemental investigation address what the RI Report did not regarding characterization of the lower regional aquifer and associated, potential migration pathways. City recommendations included water quality sampling, multiple sets of water level measurements, replacement of and use of deeper wells that were "lost" at OU-1, new sentinel wells strategically designed (e.g. horizontally located and vertically screened) to represent hydrogeologic conditions north/northwest of OU-1.

Incredibly, the EPA opted to approve ARCADIS' plan using only water level data under the ill-conceived assumption that if the "site conceptual groundwater model," also developed by ARCADIS', was confirmed, supporting water quality information was not necessary or warranted. Such a view is opposed to the universal understanding that a contaminant migration investigation must, by definition, include an understanding of both groundwater flow and quality Not surprisingly, ARCADIS', using a select subset of data, confirmed their own site conceptual model, meeting the EPA's minimal criteria, and avoided the requirement to collect additional geochemical data and the associated expense

The City understands how ARCADIS derived their general conclusions, which are generally logical based on the interpretation of data for only the upper aquifer. However, to reiterate, the basic problem and weakness in the overall approach in the RI and the subsequent groundwater supplemental study is that the existing data set is incomplete with respect to the lower regional system and the potential risk from contamination.. In this regard, EPA via their approval of ARCADIS' approach fails to address the issues that significantly influenced the decision to put the site on the NPL in the first place.

ARCADIS' statement in the supplemental groundwater study report summarizes the City's repeated concern since publication of the RI exactly: *"Although a robust data set exists for the surficial aquifer system, a limited number of wells were used to evaluate groundwater flow paths and gradients associated with the regional aquifer."* In other words, there is not enough information to draw reasonable, definitive conclusions regarding the hydrogeologic regime of the lower aquifer.

Nevertheless, in spite of this admission, ARCADIS' illogically and repeatedly concludes that hydrogeologic conditions at OU-1 do not indicate a groundwater pathway to the regional groundwater system. This conclusion is unsupported and is based solely on assumptions, not actual data. Figure 1-3 illustrates this point precisely. As shown, the zone in white represents a total lack of subsurface information that extends from Station 15 to the southeast, to the documented regional aquifer system of the City's Central Wellfield area to the north.

It is almost unbelievable that the use of water levels obtained from three wells at the Strebor site (MW-37, MW-39 and MW-40) within 400 feet of one another is justified as a reasonable data set to make determinations regarding the regional aquifer. Accepting this data as adequate is even more suspect since these three wells may not be screened in the regional aquifer.

Strebor Wells

Arcadis, and unfortunately EPA as well, has placed undue confidence in the information obtained from only three wells, located on the Strebor property immediately west of OU-1, to define the hydrogeologic conditions of the regional aquifer in its entirety. In addition, the flowing artesian condition of the wells is also mistakenly cited as a demonstration that vertical gradients are universally upward even though this is very likely a localized condition.

First, it is doubtful that the Strebor wells are set within the same aquifer screened by the City's production wells. There is simply not enough information to make such a definitive determination. The geology of the area shown between the Strebor site and the City's wellfields as shown on Figure 1-3 (Geologic Cross Section B"-B-B'-B"") based on a clear lack of data, is primarily conjecture. The City of Kalamazoo 1999 groundwater model/report and the U.S. Geological Survey (USGS) 2004 groundwater model/report were referenced as support for the preparation of this cross-section. However, none of the four cross-sections in the 1999 report come near the OU-1 site (see Figure 3 of that report). Regarding the 2004 USGS Report, the scale of this model encompassed nearly all of Kalamazoo County (i.e., approximately 576 square miles). Consequently, the hydrologic units depicted in their generalized geologic cross-section shown as Figure 4 in the USGS report are intentionally and necessarily overly generalized to simulate the groundwater flow system in Kalamazoo County.

Figure 2-3 in the ARCADIS report lines up the screened interval ranges of groups of wells at OU-1, Strebor, Performance Paper, and Panelyte with the cross-sectional representation "Regional Hydrogeologic Conceptualization from Fisher 2008." A reasonable conclusion based on a comparison of the Strebor site with the Fisher cross-section is that the Strebor deep wells are screened within the "Aquifer AU-3" and/or the "Aquitard CU-3", not "Aquifer AU-4," which is the lowest regional aquifer investigated previously and the source of the City's water supply. In addition, Figure 1-3 depicts that the screened intervals of the Strebor wells in a medium to coarse sand, not the sand and gravel unit of the regional lower aquifer.

With respect to the flowing artesian condition at Strebor, it very well may be localized, a condition seen elsewhere in the region that is governed by unique soil conditions that are not continuous beyond a relatively limited distance. For example, some of the production wells comprising the City of Kalamazoo Water Pumping Station 4 also flow under artesian conditions primarily due to the presence of a significant thickness of an aquitard bounding the upper boundary of the aquifer screened in this area. Water Pumping Station 3, located less than 2,000 feet away from Water Pumping Station 4, does not have flowing artesian conditions, Thus, a comparison of the geology and water levels at other locations for the same regional aquifer demonstrate that ARCADIS' general assumption that flowing artesian conditions at the Strebor site is characteristic of the region as a whole is simply an unfounded extrapolation.

Finally, using ARCADIS' assumption that the three deeper Strebor wells are in the regional aquifer, their water level elevations indicate that the groundwater flow direction in this layer would be toward the west/northwest in the general direction of the City's wellfields, not toward the creek. This could be possible since groundwater with an upward vertical gradient in the deeper aquifer that is not vented/directed upward through wells penetrating the acquitard could still migrate toward the production wells via horizontal flow below the semi-confining or confining unit, especially under pumping stress induced by the withdrawal of eight million gallons a day from the City's wellfields.

Water Quality

Regarding water quality, the statement in the supplemental groundwater report, that the RI indicates that certain naturally-occurring inorganic constituents (most notably iron, manganese, and arsenic) have been detected in certain shallow groundwater samples at OU-1 at concentrations that "slightly exceed" (i.e. are within the same order of magnitude) of MDEQ groundwater criteria minimizes the issue. In fact, at multiple locations across the site exceed the screening criteria for zinc by as much as 12 times, 14 times for arsenic, 57 times for iron, and at least five times for manganese. Further, this issue was expressed as a concern by the MDEQ Source Water Protection Unit in the April 2008 Interoffice communication from Brant Fisher to Paul Bucholtz.

Michigan Department of Environmental Quality (MDEQ) Source Water Protection staff have made comparisons of this site with other sites in Michigan where certain geochemical conditions may be similar and metals have become more mobile in groundwater as a consequence of bacterial processes, such as by the iron reducing Geobacter. All things considered, off-site migration of metals may be more likely and greater water quality concern than that for PCBs, particularly in the short term. This concern is supported by the known elevated levels of metals in the northern OU-1 area and the apparent change in hydraulics causing surface water to discharge into groundwater (as evidence by the surface and groundwater elevations obtained at the Reed Avenue Bridge over Portage Creek). Arcadis' statement "...this flow condition, if present, would not change the interpreted groundwater flow patterns at the portion of the Allied OU identified with residuals" obviously dismisses information that does not support or confirm their "site conceptual model." Defense of the model is repeated in every report and correspondence prepared by Arcadis and apparently accepted by EPA without detailed, evaluation and subsequent confirmation by independent experts. Consequently, the lack of thorough, rigorous, independent review, which would confirm the deficiencies of the overall project approach, could ultimately prevent selection of the most appropriate long-term remedy.

Other Observations

Regarding the hydrographs (Figures 3-8 through 3-11), we offer the following observations:

- There is an almost two-year data gap for SG-1 and SG-2, and only one or two data points for SG-3. Consequently, conclusions made on the relationship between the groundwater and surface water during that time period are speculative and risk significant misinterpretation (note erratic water levels in Figure 3-10).
- The "note box" on Figure 3-8 fails to mention that there exists a downward gradient from the Upper Sand Unit to the Lower Sand Unit in the vast majority of readings, and offers no explanation as to why the water level of the "Intermediate Sand" is not between the water level elevations of the Upper and Lower Sand Units.
- Figure 3-10 does not provide any explanation for the significant rise in the Portage Creek level in May 2006 or February 2007, and the wells used to compare with SG-2 are approximately 880 feet away.
- Figure 3-11 indicates that groundwater at MW-38 near Alcott Street has a lower head than Portage Creek at SG-3, indicating that the creek is contributing to groundwater and a reversal of gradient begins in the surficial aquifer. Again, the identification of MW-37, MW-39, and MW-40 as being in the regional aquifer may be inaccurate.

JUSTIFICATION FOR CITY'S POSITION, BASED ON EPA GUIDANCE DOCUMENTS

Returning to our original comments, the City's request for additional hydrogeologic and water quality information regarding the OU-1 is more than reasonable based on the site's location within a MDEQ-approved 5-year Wellhead Protection Capture Zone, its contamination history, and EPA's authored guidance documents for site CERCLA investigations. To emphasize this important point, we offer following specific examples of how the groundwater investigation process at this site has been conducted contrary to EPA's own guidance.

- In regards to ARCADIS' quick dismissal that the potential for the upper aquifer(s) at the OU-1 site not likely to impact the lower aquifer, EPA's Hazard Ranking System (HRS) Guidance Manual states "...contamination travels downward, so if an aquifer lies below a contaminated aquifer the lower aquifer is likely to experience contamination as well...The factor value also tends to increase with depth because big municipal wells tend to be deeper..."
- Regarding the study of contaminants in multiple aquifers, EPA's document "Evaluating Ground Water Plumes Under the Hazard Ranking System" states "....when multiple aquifers exist, it may be necessary to determine the potential for the release to migrate to an underlying aquifer. In this case, the contaminated ground water plume is evaluated for each of the four potential to release factors (containment, net precipitation, depth to aquifer, and travel time), as for any other source" and "As with all sites, evaluate targets for ground water plumes based on the nearest well, actual and potential contamination of the population, resources, and Wellhead Protection Areas." Clearly, this guidance was not followed to any appreciable degree for OU-1.
- Regarding EPA's position that the selected remedy for PCBs will also automatically address the other contaminants at the site, EPA's document "Ground Water Cleanup at Superfund Sites" states "Aquifers are complex structures. Aquifers can contain cracked and fractured rocks and other geologic variations. These variations can act as nooks and crannies that hold contaminants or create additional pathways for contaminants to follow....Different contaminants behave differently in ground water, which can make them hard to locate and remove, complicating cleanup....A thorough study is important in determining the extent of contamination, and in designing the plan for how a site will be cleaned up." The resulting investigations at OU-1 cannot be described as "thorough" by any measure, particularly EPA's own criteria.

SUMMARY

It is staff's opinion that the Superfund process was not adequately followed since the RI Report did not adequately address the concerns that were identified in the previously prepared Site Inspection regarding the groundwater contamination, multiple aquifer characterization, and potential effects on the Public Water Supply Systems(s). The high risk scores and associated comments contained in the Site Inspection Report (e.g., Ground Water Route Work Sheet) were seemingly ignored since the RI failed to address the groundwater pathway issue or even acknowledge that the site was within a MDEQ-approved Wellhead Protection Area.

Further, the RI did not follow EPA's own guidance documents regarding the appropriate characterization of multiple aquifers, the horizontal and vertical extent of site contaminants and whether they migrated off site. Contaminants of concern other than PCBs – such as metals – have largely been ignored even though exceedances of screening criteria exist near the property boundary and have likely already migrated off site. All of these issues and more were brought to the attention of EPA, their consultants, Millennium Holdings, their consultant ARCADIS, and MDEQ.

Unfortunately, EPA has not adequately addressed the expressed concerns and formally approved the RI anyway and progressed into the Feasibility Study (FS) process. The City's continued persistence that our issues be considered resulted in a "Supplemental Groundwater Evaluation Study" that only consisted of the collection of water levels, falling far short of any legitimate groundwater contamination investigation that would include water quality analyses, multiple sets of water levels, new sentinel wells, and deeper aquifer characterization – the primary concern of the City.

In summary, there has been no apparent objective third party technical review by EPA/CHM2Hill/USGS, MDEQ, or ARCADIS on behalf of Millennium Holdings of the RI Report, ARCADIS' "site conceptual model" or the Supplemental Groundwater Investigation Report. Consequently, City staff and their consultant NTH Consultants have reviewed site documentation and have raised numerous observations, concerns, requests, and suggestions in the attempt to have adequate information available for the site prior to the selection of the long-term site remedy. Despite these expressed issues and concerns about the site, the vast majority of concerns have been ignored or simply not taken into serious consideration. It is highly questionable that an adequate amount of information about the site and the regional aquifer has been obtained and evaluated to make appropriate scientifically-based recommendations for long-term site remedy considerations, let alone the selection of one. Finally, although the general Superfund process may have been legally followed to date for OU-1, the intent of the process to obtain an appropriate knowledge base prior to progressing into the subsequent phases has seemingly been compromised.